

In the Claims

1-48 (Cancelled)

49. (Currently Amended) A catheter shaft comprising:

a first tube including an inflation lumen in fluid contact with a dilation balloon, an inside wall surface, an outside wall surface, and a first tube length, said first tube having an orifice in a portion of said first tube;

wherein said first tube includes a tube wall having proximal portion, a distal portion, and an intermediate tie-layer portion disposed between said proximal portion and said distal portion, said intermediate tie-layer portion being disposed at an angle relative to said tube wall;

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a second tube inserted through, and extending distally from, said orifice inside said inflation lumen, said second tube having a length, a lumen therethrough, a proximal portion, an inside wall surface and an outside wall surface; and

F | a bonding region wherein said second tube outside wall surface is bonded to said first tube outside wall surface by re-flow of the first and second tube outside wall surfaces, said second tube inside wall surface being formed of a second, lubricious material for a majority of said second tube length, said first tube wall having a layer of a first, flexible material extending for a majority of said first tube length, said first material being different from said second material.

50. (Original) A catheter shaft as recited in claim 48, wherein said bonding region is proximate said orifice.

51. (Original) A catheter shaft as recited in claim 48, wherein said bonding region includes bonding between said first tube inside surface and said second tube outside surface distal of said orifice.

52. (Original) A catheter shaft as recited in claim 48, wherein said second tube inside and outside wall surfaces are formed of said second material.

53. (Original) A catheter shaft as recited in claim 51, wherein said second tube wall is formed of substantially said second material therethrough.

54. (Original) A catheter shaft as recited in claim 52, wherein said first tube inside surface is formed of said second material proximate said bonding region.

55. (Original) A catheter shaft as recited in claim 53, wherein said first tube has said second material disposed over most of said first tube inside surface proximate said bonding region and distal of said bonding region.

56. (Original) A catheter shaft as recited in claim 54, wherein said first tube includes said second material as an inside layer, said first material as an outside layer, and a tie-layer disposed between said inside and outside layers.

57. (Original) A catheter shaft as recited in claim 53, wherein said second tube includes polyethylene, said first tube includes an inside layer of polyethylene, an outside layer of PEBA, and a tie-layer disposed between said inside and outside layers.

58. (Original) A catheter shaft as recited in claim 53, wherein said first tube has said inside surface formed of said second material proximate said bonding region and has said inside surface formed of said first material distal of said bonding region.

59. (Original) A catheter shaft as recited in claim 57, further comprising a transition tie-layer disposed between said first and second materials.

60. (Original) A catheter shaft as recited in claim 58, wherein said second tube includes polyethylene and said first tube includes polyethylene proximate said bonding region and said first tube is formed of PEBA distal of said tie-layer.

61. (Original) A catheter shaft as recited in claim 48, wherein said first tube inside surface includes said first material.

62. (Original) A catheter shaft as recited in claim 60, wherein said first tube inside and outside surfaces are formed of said first material.

63. (Original) A catheter shaft as recited in claim 61, wherein said first tube is formed of said first material proximate said bonding region and distal of said bonding region.

64. (Original) A catheter shaft as recited in claim 62, wherein said second tube has a proximal portion proximate said bonding region having an outside surface formed of said first material.

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65. (Original) A catheter shaft as recited in claim 62, wherein said second tube is formed of said first material in said proximal portion and formed of said second material distal of said proximal portion and has a transition tie-layer therebetween.

66. (Original) A catheter shaft as recited in claim 64, wherein said first material includes PEBA and said second material includes polyethylene.

67. (Original) A catheter shaft as recited in claim 62, wherein said second tube is formed of said second material, said second tube proximal portion includes a tie-layer disposed over said second material and an outer layer of said first material disposed over said tie-layer.

68. (Original) A catheter shaft as recited in claim 66, wherein said first material includes PEBA and said second material includes polyethylene.

69. (Original) A catheter shaft as recited in claim 62, wherein said second tube has said inside layer formed of said second material, a tie-layer disposed over said inside layer, and an outside layer formed of said first material disposed over said tie-layer.

70. (Original) A catheter shaft as recited in claim 68, wherein said first material includes PEBA and said second material includes polyethylene.

71. (Original) A catheter shaft as recited in claim 62, wherein said second tube proximal portion is formed of said first material and said second tube distal of said proximal portion is bonded to said proximal portion and has an inside layer formed of said second material, a tie-layer disposed over said inside layer, and an outer layer formed of said second material disposed over said tie-layer.

72. (Original) A catheter shaft as recited in claim 70, wherein said first material includes PEBA and said second material includes polyethylene

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73. (Original) A catheter shaft as recited in claim 62, wherein said second tube proximal and distal portions have an inside layer formed of said second material and an outside tie-layer disposed over said inside layer.

74. (Original) A catheter shaft as recited in claim 72, wherein said first material includes PEBA and said second material includes polyethylene, wherein said second tube outside tie-layer wall surface is heat bonded to said first tube inside wall PEBA surface proximate said orifice.

75. (Currently Amended) A catheter shaft comprising:

a first tube including an inflation lumen in fluid contact with a dilation balloon, an inside wall surface, an outside wall surface, and a first tube length, said first tube having an orifice in a portion of said first tube;

wherein said first tube includes a tube wall having proximal portion, a distal portion, and an intermediate tie-layer portion disposed between said proximal portion and said distal portion, said intermediate tie-layer portion being disposed at an angle relative to said tube wall;

a second tube inserted through, and extending distally from, said orifice inside said inflation lumen, said second tube having a length, a lumen therethrough, a proximal portion, an inside wall surface and an outside wall surface;

a bonding region wherein said second tube outside wall surface is bonded to said first tube outside wall surface by re-flow of the first and second tube outside wall surfaces, said second tube inside wall surface being formed of a second, lubricious material for a majority of said second tube length, said first tube wall having a layer of a first, flexible material extending for a majority of said first tube length, said first material being different from said second material;

a third tube, the first tube being disposed distal of the third tube; and

a core wire extending distally from the third tube into the first tube.

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76. (Original) A catheter shaft as recited in claim 75, wherein said bonding region is proximate said orifice.

77. (Original) A catheter shaft as recited in claim 75, wherein said bonding region includes bonding between said first tube inside surface and said second tube outside surface distal of said orifice.

78. (Original) A catheter shaft as recited in claim 75, wherein said second tube inside and outside wall surfaces are formed of said second material.

79. (Original) A catheter shaft as recited in claim 78, wherein said second tube wall is formed of substantially said second material therethrough.

80. (Original) A catheter shaft as recited in claim 79, wherein said first tube inside surface is formed of said second material proximate said bonding region.

81. (Original) A catheter shaft as recited in claim 80, wherein said first tube has said second material disposed over most of said first tube inside surface proximate said bonding region and distal of said bonding region.

82. (Original) A catheter shaft as recited in claim 81, wherein said first tube includes said second material as an inside layer, said first material as an outside layer, and a tie-layer disposed between said inside and outside layers.

83. (Original) A catheter shaft as recited in claim 78, wherein said second tube includes polyethylene, said first tube includes an inside layer of polyethylene, an outside layer of PEBA, and a tie-layer disposed between said inside and outside layers.

84. (Original) A catheter shaft as recited in claim 78, wherein said first tube has said inside surface formed of said second material proximate said bonding region and has said inside surface formed of said first material distal of said bonding region.

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85. (Original) A catheter shaft as recited in claim 84, further comprising a transition tie-layer disposed between said first and second materials.

86. (Original) A catheter shaft as recited in claim 85, wherein said second tube includes polyethylene and said first tube includes polyethylene proximate said bonding region and said first tube is formed of PEBA distal of said tie-layer.

87. (Original) A catheter shaft as recited in claim 75, wherein said first tube inside surface includes said first material.

88. (Original) A catheter shaft as recited in claim 87, wherein said first tube inside and outside surfaces are formed of said first material.

89. (Original) A catheter shaft as recited in claim 88, wherein said first tube is formed of said first material proximate said bonding region and distal of said bonding region.

90. (Original) A catheter shaft as recited in claim 89, wherein said second tube has a proximal portion proximate said bonding region having an outside surface formed of said first material.

91. (Original) A catheter shaft as recited in claim 89, wherein said second tube is formed of said first material in said proximal portion and formed of said second material distal of said proximal portion and has a transition tie-layer therebetween.

92. (Original) A catheter shaft as recited in claim 91, wherein said first material includes PEBA and said second material includes polyethylene.

93. (Original) A catheter shaft as recited in claim 89, wherein said second tube is formed of said second material, said second tube proximal portion includes a tie-layer disposed over said second material and an outer layer of said first material disposed over said tie-layer.

94. (Original) A catheter shaft as recited in claim 93, wherein said first material includes PEBA and said second material includes polyethylene.

95. (Original) A catheter shaft as recited in claim 89, wherein said second tube has said inside layer formed of said second material, a tie-layer disposed over said inside layer, and an outside layer formed of said first material disposed over said tie-layer.

96. (Original) A catheter shaft as recited in claim 95, wherein said first material includes PEBA and said second material includes polyethylene.

97. (Original) A catheter shaft as recited in claim 89, wherein said second tube proximal portion is formed of said first material and said second tube distal of said proximal portion is bonded to said proximal portion and has an inside layer formed of said second material, a tie-layer disposed over said inside layer, and an outer layer formed of said second material disposed over said tie-layer.

98. (Original) A catheter shaft as recited in claim 97, wherein said first material includes PEBA and said second material includes polyethylene

99. (Original) A catheter shaft as recited in claim 89, wherein said second tube proximal and distal portions have an inside layer formed of said second material and an outside tie-layer disposed over said inside layer.

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100. (Original) A catheter shaft as recited in claim 99, wherein said first material includes PEBA and said second material includes polyethylene, wherein said second tube outside tie-layer wall surface is heat bonded to said first tube inside wall PEBA surface proximate said orifice.
